3/15/2012 AP CHEMISTRY BLOG

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BREAKING NEWS IN FIFTH PERIOD AP CHEM- Romon is part Japanese :0! How cool!

Less exciting… NOTES

BASES

* The OH- is a strong base
  + Hydroxides of the alkali metals (1A) are strong bases
    - b/c they dissociate completely (soluble in H2O)
  + The hydroxide of alkaline earth metals (ex Ca(OH)2) are strong dibasic bases
    - but they don’t dissociate completely🡪 use heat to help them dissolve
    - used as antacids b/c hydroxide can’t build up and hurt them
* Bases without OH-
  + Are weak acids
  + Bases are proton acceptors
    - Ex: NH3 + H2O 🡪 🡨 NH4++ OH-
    - NH3 has a lone pair 🡪 H’s proton is attracted🡪 lone pair accepts proton= coordinate covalent bond

🡪many weak acids contain N

* Strengths of Bases
  + Strong
    - Hydroxides
    - Large Ka
    - Inorganic acids
  + Weak
    - Everything else besides hydroxides
    - Smaller Ka
    - Organic bases covalently bonded
* General Formula for Bases
  + Base (aq) +H2O (l) 🡪 🡨 BH+ (aq)+ OH- (aq)
* Example: Calculate the pH of a 4.0 M solution of pyridine with a Kb of 1.7 X 10-9 
  + C5H6N + H2O 🡪 🡨 C5H6NH+ + OH-

Kb= ([C5H6NH+] [OH-])⁄ ([C5H6N])

🡪USE ICE Table & be aware of what you’re calculating (pH or pOH)

* Polyprotic Acids- acids that dissociate stepwise
  + 1st H comes off easily
    - large Ka
    - Denoted by Ka1
  + 2nd H comes off with more difficulty
    - small Ka
    - Denoted by Ka2

HOMEWORK

P. 807 # 24, 28, 44, 48, 64, and 68

24) A) pH= -log[H+]

pH = -log [.0333]

pH=1.48 🡪 acidic

B) pOH= -log [OH-]

pOH= -log[.0347]

pOH= 1.46

pH + pOH= 14

pH +1.46= 14

pH= 12.54 🡪 basic

28) A) pH= -log [H+] pOH= 14 –pH

3.47= -log [H+] pOH= 14 – 3.47= 10.53-

-3.47= log [H+] pOH= -log [OH-]

[H+]= 3.39 X 10-4 10.53= -log [OH-]

[OH-]= 2.95 X 10-11

B) 4.33= -log [OH-] 14 - 4.33= pH= 9.67

[OH-]= 4.68 X 10-5 9.67= -log [H+]

[H+] = 2.14 X 10-10

44) A) PO4-3 B) NH3 C) S2-

48) A) NH3 (base)+ HNO3 (acid)🡪 🡨 NH4  (conjugate acid) + NO3-1 (conjugate base)

B) O2- (base) + H2O (acid) 🡪 🡨 OH- (conjugate acid) + OH- (conjugate base)

C) NH4 (acid) + BrO3 (base) 🡪 🡨 NH3 (conjugate base) +HBrO3 (conjugate acid)

64)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | HA + | H2O 🡪 🡨 | H+ + | A- |
| I | .035 M |  | 0 | 0 |
| C | -x |  | +x | +x |
| E | .035 -x |  | x | x |

4.88= -log [H+]

[H+] = 1.32 X 10-5 M

Ka= ([1.32 X 10-5] 2) / (.035 – 1.32 X 10-5)

Ka= 4.98 X 10-9

68)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | HClO + | H2O 🡪 🡨 | H+ + | ClO- |
| I | .115 |  | 0 | 0 |
| C | -x |  | +x | +x |
| E | .115-x |  | X | X |

pKa= -log Ka

7.54 = -log Ka

Ka= 2.88 X 10-8

2.88 X 10-8 = (x2) / ( .115 –x)

0= -x2 -2.88 X 10-8x +3.12 X10-9 x= 5.75 X 10-5

[H+] = 5.75 X 10-5 [ClO-]= 5.75 X 10-5 [HClO] = .1149

pH=-log [H+]= -log [5.75 X 10-5]= 4.24

AP Chem Joke of the Day

